Pacemaker

OP-021

Reduction of Inappropriate ShockS bY InCreaseD Zones (RISSY-ICD) Trial

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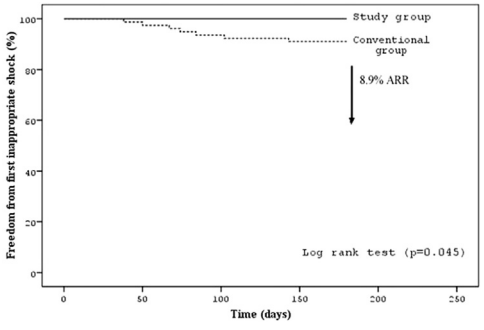
Background: Inappropriate shock is frequently encountered clinical problem despite advance technologies to detect and treat the arrhythmia in most modern ICDs.
Aim: The aim is to evaluate whether simply programming the device zones can effectively increase appropriate shocks and decrease inappropriate shocks.
Methods: All-comers (n=122) with an indication for an ICD device (ICD + CRT-ICD) for primary prevention were included in the study. Two groups were formed according to programmed therapy zones. Conventional group (n=79) had 3 zones as VT1 (167-182 bpm with ATP + shock), VT2 (182-200 bpm with ATP + shock) and VF (>200 bpm with shock). Study group (n=43) had also 3 zones as VT1 (171-200 bpm with ATP + shock), VT2 (200-230 bpm with ATP and shock) and VF (>230 bpm with shock). All participants were followed-up for 6-month. The primary objectives were first episode of appropriate and inappropriate therapies.
Results: The mean age was 56±12 years with male ratio of 88% and 66% had ischemic origin, 53% had hypertension, 18% had diabetes, and 19% had atrial fibrillation. ICD was present in 80% and 20% had CRT-ICD device. The mean left ventricular EF was 26%±5. The primary objective of first episode of appropriate shock was higher in the study group compared with the conventional group (16.3% vs. 5.1%, p=0.043). The other primary objective of first episode of inappropriate shock was lower in the study group compared with the conventional group (0% vs. 8.9%, p=0.045) (Figure).
Conclusion: Increased therapy zones were related with %9 absolute reduction in first inappropriate shock.



OP-022

Fragmented QRS Resolution on Post-implantation Electrocardiography: A Predictor of Response to Cardiac Resynchronization Therapy

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Purpose: Cardiac resynchronization therapy (CRT) is an established treatment for patients with symptomatic heart failure and a wide QRS complex. Fragmented QRS (fQRS) on a 12-lead electrocardiography (ECG) has been shown to predict cardiac events. We aimed to investigate the relationship between resolution of fQRS and response to CRT.
Methods: Sixty-seven consecutive patients (38 men, mean age 65±11) with fQRS undergoing CRT were studied. The presence of fQRS was assessed using standardized criteria. The resolution of fQRS was assessed on post-implantation ECG. Echocardiographic response to CRT was defined by a ≥15% reduction in left ventricular end-systolic volume (LVESV) at 6 months follow-up.
Results: The baseline clinical and echocardiographic variables of responder and non-responder patients showed no statistically significant difference. Thirty-nine patients (58%) had response to CRT. Left ventricular end-systolic volume significantly decreased from 150±64 to 100±48 in responder patients (p=0.001). There was not any significant decrease in LVESV in non-responder patients (157±70 vs. 153±66, p=0.45). Number of leads with fQRS decreased from 4.4±1.8 to 1.7±1.6 in responder patients (p<0.001). Number of leads with fQRS was not significantly changed in non-responder patients (4.2±2.2 vs. 5.1±2.4, p=0.06). In multivariate analysis, significant associates of response to CRT was evaluated adjusting for etiology of cardiomyopathy, baseline QRS width, baseline left ventricular ejection fraction, number of leads with fQRS and resolution of fQRS. Resolution of fQRS was the only predictor of response to CRT (OR 0.018, 95% CI, 0.004-0.083, p<0.001).
Conclusions: Resolution of fQRS on post-implantation ECG could predict response to CRT.

OP-023

The Relationship between the Reverse Left Ventricular Remodelling Developing After Cardiac Resynchronisation Therapy and the Postimplantation Changes in QRS Duration and Presence of Fragmented QRS

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Background: In this study we aimed to investigate clinical and echocardiographic parameters that affects development of left ventricular reverse remodelling after cardiac resynchronisation therapy (CRT) and association between reverse remodelling with electrical remodelling and fragmented QRS.
Patients and Method: Totally seventy six (28 female and 48 male; %37and %63 respectively) patients who had undergone CRT between August 2011-March 2012 in Cardiology section of Kocaeli University Medicine Faculty were included in to the study. Age range of patients was 35 to 91. Preimplantation and postimplantation sixth month basal echocardiographic measurements were obtained and electrocardiographic findings, physical examinations and functional capacity were evaluated. Development of reverse remodelling was defined according to decrease of left ventricular end-systolic volume. Association between reverse remodelling with post-implantation QRS interval and fragmented QRS were investigated.
Results: In our study reverse remodelling developed in fifty patients (%66). Reverse remodelling group's pre-implantation mean QRS interval was 156±16 msn., whereas post-implantation QRS interval was 115±18 msn. (p=0,001). Preimplantation QRS interval was significantly wider in the reverse remodeling group respect to other group (156±16 msn., 147±16 msn., p=0,009). We have found that baseline QRS >150 msn has %72 sensitivity and %75 specificity and the changes above 20 msn in QRS duration have %84 sensitivity and %95 specificity for prediction of response to CRT.
Conclusion: In our study we stated that the most valuable predictive parameters for reverse remodelling after CRT were basal QRS interval and change in post-implantation QRS interval. Besides, we couldn't determine any relationship between presence of fragmented QRS with reverse remodelling.

General

OP-024

Relationship between Left Ventricular Ejection Fraction and Number of Fragmented QRS Complex Derivations on Standard 12-Lead Electrocardiogram in Acute ST-Elevated Myocardial Infarction Patients

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Background: Fragmented QRS (fQRS) developed by intraventricular depolarization and signal conduction disturbance due to myocardial ischemia, scar or fibrosis. In the literature, some of the studies showed negative correlation between left ventricular ejection fraction (LVEF) and fQRS. Current study, aimed to evaluate if there is relationship between number of fQRS derivations and LVEF.
Methods: Between 2010-2012 years, 335 consecutive patients admitted to coronary care unit of our hospital with acute ST-elevated myocardial infarction (STEMI) were included in study population. Electrocardiographic and echocardiographic properties of these patients were evaluated prospectively.
Results: Two hundred and seventy of the patients were male (80%). QRS fragmented and non fQRS group had 217 (65%) and 118 (35%) patients, respectively. Mean age of the patients was 58±12 years. 222 (66%) patients were smoker, 9 (3%) patient was alcohol consumer, 144 patient (42%) had hypertension, 73 patient (21%) had diabetes mellitus, 6 patient (1.7%) had chronic renal failure, 25 patient (7.4%) had hyperlipidemia or using antihyperlipidemic drugs. QRS fragmented group had statistically significant low LVEF compared to non fQRS group (Table-1). Also, the number of fQRS derivations were associated with lower LVEF. Statistically significant negative correlation between increased number of fragmented QRS derivations and LVEF was detected(r=-0.379, p=<0.001) (Table-2).
Conclusion: Echocardiographic evaluation in acute STEMI patients showed that fQRS group had lower ejection fraction values which had statistically significant negative relationship between increased fragmented derivation number and ejection fraction. Presence and number of fQRS derivations in acute ST-elevated myocardial infarction was associated with expansion of infarction. At cellular level, this may be the effect of the myocardial ischemia or scar on myocardial electrical parameters.

Table 1. Left ventricular function according to the fragmentation seen

	Fragmentation(-)	Fragmentation(+)	
	Mean±SD(Median)	Mean±SD(Median)	p
Ejection fraction (%)	50.21±10.47 (50)	41.66±11.45 (40)	0.001**
Left ventricular systolic diameter	3.19±0.59 (3.2)	3.67±0.79 (3.6)	0.001**
Left ventricular diastolic diameter	4.87±0.42 (4.9)	5.17±0.61 (5.2)	0.001**
Student t Test, ++Mann Whitney UTest **p<0.01			

Table 2. Exchange of Left Ventricular EF According to Number of fQRS Derivations

Number of fragmented Derivations	0	2	3	≥4	
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	p
LVEF (%)	49.93±10.48	43.84±10.90	42.79±11.23	38.54±11.84	0.001**
One Way Anova Test **p<0.01					

Echocardiography

OP-025

Evaluation of Atrial Electromechanical Delay and its Relationship to Inflammation and Oxidative Stress in Patients with COPD

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Objective: The aim of this study was to evaluate atrial electromechanical delay, inflammation, and oxidative stress parameters, and was to investigate clinical and laboratory characteristics affecting atrial electromechanical delay in patients with chronic obstructive pulmonary disease (COPD).
Methods: Forty-three patients with COPD (60.5±9.9 years) and 50 healthy controls (59.6±7.1 years) were included. Using tissue Doppler imaging (TDI), atrial electromechanical delay intervals were measured from lateral mitral annulus (cPA lateral) and lateral tricuspid annulus (cPA tricuspid), and corrected for heart rate. Left and right ventricles functions were examined using conventional and TDI. Plasma levels of high sensitive C-reactive protein (hsCRP) and oxidative stress parameters were measured. Factors associated with atrial electromechanical delay were evaluated by stepwise multiple regression analysis.
Results: Clinical characteristics and spirometric findings for the two groups are presented in Table 1. Age, sex, body mass index, body surface area, and systolic and diastolic blood pressure are similar between the groups (p>0.05). Smoking status and heart rate at rest are significantly higher in patients with COPD compared to the controls (p<0.05). Conventional and tissue Doppler echocardiographic parameters for the groups are shown in Table 2. Left atrium volume index, sPAP, mitral E/A ratio, and right ventricle myocardial performance index differ significantly between the groups (p<0.05). Measurements of atrial electromechanical delay, oxidative stress, and inflammation markers between COPD patients and controls are presented in Table 3. cPA lateral, cPA septum, and cPA tricuspid are significantly higher in patients with COPD compared to controls (p<0.05). Also, hsCRP and malondialdehide are significantly higher in patients with COPD (p<0.05). cPA lateral is independently related to lateral Em/Am ratio (β=-0.29, p=0.004) and FEV1/FVC ratio (β=-0.24, p=0.02). cPA tricuspid is independently related only to FEV1/FVC ratio (β=-0.51, p<0.001).
Conclusions: This study shows that atrial electromechanical delay intervals are prolonged in patients with COPD. Prolongation of atrial electromechanical delay may be related with inflammation, oxidative stress, and FEV1/FVC ratio in these patients.

Table 1. Clinical and spirometric characteristics of the subjects

	Patients with COPD (n = 43)	Controls (n = 50)	P value
Age, years	60.5±9.9	59.6±7.1	0.82
Females n (%) Males n(%)	2 (5) 41 (95)	6 (12) 43 (88)	0.28
BMI, kg/m2	26.7±4.6	27.0±3.9	0.68
BSA, m2	1.88±0.20	1.91±0.15	0.37
Smoking status, n (%)	38 (88)	11 (22)	<0.001
SBP, mmHg	122.2±10.7	122.4±8.9	0.92
DBP, mmHg	75.4±7.5	75.0±7.1	0.77
Heart rate, beats/min	74.5±13.6	69.6±10.2	0.048
FEV1, (%)	64.6±21.3	99.8±13.9	<0.001
FEV1-FVC ratio	59.4±10.1	79.1±5.2	<0.001

COPD, chronic obstructive pulmonary disease; BMI, body mass index; BSA, body surface area; SBP, systolic blood pressure; DBP, diastolic blood pressure; FEV1, forced expiratory volume in the first second; FVC, forced vital capacity.

Table 2. Intergroup comparison of echocardiographic parameters

	COPD patients (n=43)	Controls (n=50)	P value
LV end-diastolic diameter, mm	47.6±4.2	48.6±3.5	0.23
LV ejection fraction, (%)	65.7±2.7	66.4±3.1	0.23
LV mass index, g/m2	88.9±15.4	93.4±16.7	0.18
Left atrial dimension, mm	35.2±3.9	36.1±3.6	0.22
Left atrial volume index, ml/m2	19.9±6.7	24.9±9.9	0.006
Right atrial area, cm2	15.0±6.5	14.4±2.9	0.58
Right ventricle basal, mm	36.5±5.0	36.5±4.0	0.96
Right ventricular fractional area change, (%)	42±5.4	46.3±6.1	0.08
TAPSE, cm	2.1±0.3	2.2±0.2	0.34
sPAP, mmHg	27.9±8.9	23.0±3.3	0.001
Conventional Doppler			
Mitral E/A	0.88±0.27	1.01±0.25	0.02
Tricuspid E/A	1.00±0.23	1.19±0.20	0.001
Tissue Doppler			
Lateral Em/Am	0.83±0.3	0.87±0.3	0.49
Lateral MPI	47.5±9	46.1±7	0.38
Septum Em/Am	0.71±0.2	0.69±0.2	0.60
Septum MPI	50.7±11.2	51.9±8.5	0.19
Tricuspid Em/Am	0.63±0.2	0.68±0.2	0.24
Tricuspid MPI	51.9±9.7	46.1±7.9	0.002

COPD, chronic obstructive pulmonary disease; LV, left ventricle; TAPSE, tricuspid annular plane systolic excursion; sPAP, systolic pulmonary artery pressure; MPI, myocardial performance index.